

The Evolution of Tertiary Production in Pre-World War II Greece: 1833-1939*

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1. Introduction

The studies examining the economic development of various countries during the pre – World War II period by using national accounts data have their roots in the pioneering works of Kuznets, which took place in the 1950's. Similar research has subsequently been carried out extensively in Europe. As a result, by the 1980's there existed several studies that estimated the pre-war gross domestic or national product (GDP or GNP) for the majority of the then Western European countries¹.

One European country where similar studies were delayed is Greece, the first relevant attempt having been published as late as 1995². Shortly after, a more complete attempt was made. This was complete in the sense that it aimed at the construction of a series of national accounts, estimated on the basis of modern classifications, that cover the whole pre-WWII period during which the country had existed as an independent state³. The study was completed recently⁴ and constitutes an important upgrade and extension of the previous work mentioned, not only because it covers a longer period but also because it improves on the earlier estimates. Overall, given the definitions and classifications used and the procedures employed,

* Part of this paper is based on a research project funded by the Historical Archives of the National Bank of Greece.

¹ See Van Arc (1995).

² See Kostelenos (1995).

³ This being 1833-1939.

⁴ See Kostelenos *et al.* (forthcoming).

the time series estimated are generally compatible and comparable with similar estimates made for other countries.

The present paper stems from this wider research effort. As noted, the choice of the time period is quite important as it covers the whole period since the country achieved its independence up to the outbreak of WWII. For this period there exist no other relevant continuous time series in the country, the previous attempt covering only part of it (1858-1938), whereas official estimates have only been constructed after WWII. The particular objectives on hand are to outline the procedures used in estimating the 'value added' of the tertiary sector during the period 1833-1939, evaluate its contribution in Greek GDP and compare its share of GDP with similar ratios observed in certain other European countries.

In this context, the present work consists of five sections. The first is an introduction of the paper. The second presents briefly the basic sources used. The third describes the methodology that was followed in the study. The fourth evaluates the results and compares them with those of other European countries. Finally, in the last section the basic conclusions of the research are presented.

2. Basic Sources

The tertiary sector normally includes all the economic activities that produce services. In the present work the estimation of the value added of this sector also includes construction. This was implemented for practical reasons and, to some extent at least, stretches the relevant definition. Unfortunately, this could not be avoided⁵. As a consequence, for present purposes the activities included in the sector are the following:

- Transportation: land (including railways), sea, air

⁵ From a practical point of view this approach proved to be the least troublesome of those attempted as all the alternative procedures tried appeared to create bigger problems for the aggregates eventually estimated. This forced, in a sense, the adoption of this particular and unorthodox indirect method. These problems were considered to be such an important drawback because the estimation of "accurate" aggregate magnitudes was the basic goal of the study. It must also be noted that the general consideration, regarding the time required to do everything "properly", which is referred to in footnote 10 below, was also a factor contributing to the compromise adopted.

- Communication (includes the post office and all other communication services)
- Public Administration
- National Security
- Other Public Services (Health, Education, etc.)
- Banking and Insurance activities
- Ownership of Dwellings
- Construction
- Trade (wholesale and retail)
- Other Services

Of these activities some were undertaken by the private sector, others by the public sector, whereas there were also a few undertaken by both.

The major and most important sources that were consulted are the following:

For the services of the public sector (including communications and transportation): Antoniou *et al.*, Ministry of Finance annual reports of the revenues and expenses of the state (various years from 1833 until 1939), Results of the annual reports of the state (1880-1905) and Minority Report of the Parliamentary Committee on the budget of the revenues and expenses of the state (1907). For Banking and Insurance: Annual or semi-annual balance sheets and income statements of various banks and insurance companies (various years from 1841 and thereafter) and Kostis - Tsokopoulos (1988). For railways: Koronis (1914). For shipping: Andreadis (1913), (1923) and (1929) and for GDP in general (and dwellings in particular) Evelpidis (1937) and (1938).

In addition to these specialised sources, data were also drawn from sources of a more general content. As an example of these one can mention Mansolas (1867), Bell-Montague (1927), Bickford-Smith (1893), Bernardakis (1885), Moraitinis (1877), Skiadas (1891), Leconte (1847), Mulhall (1892) and (1896), Vasiliou (2002) as well as the *Statistical Yearbooks of the National Statistical Service of Greece* (1930-1939) and the annual reports of the Governor of the National Bank of Greece (commencing in 1841 onwards).

The great variety of the available data and information, which are often contradictory, has significant implications for our estimates. As a

result, the estimates for certain activities are reliable while those for others are less secure. In certain cases it was impossible to obtain any estimates at all using direct methods. In these cases it was necessary to employ indirect procedures which will be reviewed in the next section. As a consequence, the end result, i.e., the time series constructed for the value added of tertiary production as a whole, which forms a constituent of the above estimates, can only be accepted and used as long as the assumptions made and the shortcomings involved have been fully understood.

3. Methodology

Complications in determining the estimate of the final product due to differences in definitions are more likely to be caused in the tertiary, rather than in the other two sectors included in the GDP aggregate⁶. The cause of these complications can be found in the nature of the products of this sector⁷. Obviously it is very difficult to determine quantitatively and consequently to measure the products of this sector⁸.

In general, every activity of this sector is a different case, meaning that each has to be estimated in a special way. As a result of the difficulties implied in this approach, the study does not follow a single method in the estimation of all the activities. Instead, it is forced to use direct and indirect methods. Such approaches have successfully been used in countries where direct estimations could not be made.

The general type of indirect approach used is based upon the assumption that GDP is related to some known parameter (e.g. public expenditure, exports, imports, money supply) and that the form of this relationship can be specified. Thus, when the nature of the relationship has been determined, GDP is estimated on the basis of the known

⁶ For example, it has been argued that some transportation services are intermediate goods and consequently they should not be included in GDP.

⁷ E.g. an important complication can be caused by the fact that the service is produced and consumed simultaneously.

⁸ See Liesner (1975). An additional problem is that many goods of the tertiary sector are not divisible.

parameter. It is worth noting that P. Bairoch⁹ has computed such an estimate for Greece, for the period after 1840.

This general idea was employed in the present study to make indirect estimates of specific activities¹⁰. In this context, the approaches used, both direct and indirect, to estimate the value added of each category of the tertiary sector are the following:

- **Transportation:** the value of the output of railways, roadways and air transport was estimated with the help of proxy variables¹¹. The output of the remaining land transport as well as of water transport was estimated separately, by using indirect methods.

- **Communications:** the value of the output of this activity is included in the corresponding value of production of the public sector (the post office, telegraph office and telephone company were public services so all the relevant figures are included in the corresponding activity)¹².

- **Public Administration, National Security (including national defence) and Other Public Services:** the estimates adopted consist of the sum of the relevant wages and salaries as well as of the rents paid by the state.

⁹ See Bairoch (1976), who used exports as the parameter upon which the GDP estimate was based.

¹⁰ Indirect procedures have been used to make estimates of items in the national accounts magnitudes in various cases. In general this has been done either when direct approaches were thought not to be possible due to the lack of the data required for such a task, or in order to obtain general estimates quickly without getting involved in such procedures that were extremely time-consuming, because of the lack of any complementary research undertaken in the field. In our case it is this complete lack of relevant supporting research that forced us to compromise, in order to cut down on the time required, and adopt the unconventional indirect procedure described in the text. For a more detailed description of a number of indirect methods used by various authors see Bairoch (1978) and Kostelenos (1995).

¹¹ The variables (parameters) upon which the estimates were based are the annual revenues of the railway, roadway and airway companies. The estimates made are approximations. Overall, they are considered more precise than those that would have been made if expenditure had been used instead.

¹² An attempt was also made to estimate the value of the output of communications separately, by using a proxy variable. In this context the revenues and expenditures of the corresponding offices (i.e. post office) were used. These estimates were not included in the totals.

The data are taken from the Review of the Expenditure of the Greek State and include the figures for communications¹³.

- Banking and Insurance: the estimates were based on data referring to wages, profits and rents, which are taken from the annual and semi-annual balance sheets and income statements for various years of the main banks and insurance companies¹⁴.

- Income from Dwellings: in this case it was only possible to determine the rents paid by the public sector. As a result, the total value-added for the activity was estimated on the basis of these figures with the help of indirect methods¹⁵.

- Trade, Construction and Other Services: here the value-added figures were estimated totally by the use of indirect methods.

In general, in order to estimate the missing values indirectly two different approaches were considered. These are equivalent to each other and, although theoretically they should provide us with complementary results, this is quite unlikely to happen in practice.

In both cases the indirect estimation is based on the calculation of a ratio among known and unknown magnitudes (in this particular case the values of production). First, the size of the ratio for a time period for which all the magnitudes are known is calculated. Next, on the basis of qualitative information, certain "plausible" assumptions about the manner in which this ratio is expected to change are made. This permits us to hypothesise what the expected size of the ratio is likely to be during the period for which the estimates are required¹⁶. Finally, this ratio is used (as a markup coefficient¹⁷) in order to estimate the unknown magnitudes.

¹³ The remaining expenses include the value of production of some other services, which cannot be estimated directly (for instance, publications and advertisements). The relevant values were estimated indirectly without using the data of this series.

¹⁴ In this context in order to estimate missing data, extensive use of statistical methods was made. Here there were some years for which there were no data whatsoever and some years for which there existed data for a limited number of Banks and Insurance companies.

¹⁵ The data referring to rents paid by Banks and Insurance Companies did not offer sufficient help.

¹⁶ This is obviously the least determined part.

¹⁷ This coefficient is the inverse of the ratio of the variables. When the ratio is 2/3 the coefficient is 1.5.

For example, let A denote the value of the output of the activities that can be estimated directly (using available data) and B represent the activities for which such estimates cannot be made. Next, assume that the size of the ratio (A/B) during a year for which both A and B are known, is 0.5. In this case $B = (1.0/0.5) \times A \rightarrow B = 2A$. It follows that $(A+B) = A+2A = 3A$. In other words, the resulting coefficient is 3. The crux of the matter then is to "predict" the size of the coefficient for the period for which B is unknown.

The difference between the two possible alternative approaches lies in the specification of the known magnitudes. The first adopts the total value of production of the primary and the secondary sectors as well as that of the known activities of the tertiary sector. The second adopts the production value of the known activities of the tertiary sector.

There are advantages and disadvantages in both cases. The adoption of the larger aggregate links the unknown part of the output of the tertiary sector with the known total output of the rest of the economy, while the adoption of the smaller aggregate links the unknown activities of the sector with its known ones. Here, the second approach was chosen. This permits, to some extent at least, the subsequent examination of the long-term evolution and cyclical fluctuations of the tertiary sector. By comparison, use of the other approach would, in essence, embody the fluctuations of the total (known) value of production in these movements and hinder the independent examination of the sector.

Obviously, the problem is the same in both cases: the determination of the period for which the ratio of known/unknown figures is calculated and the specification of the manner according to which it is expected to vary between this period and the period for which the estimates must be made. The two periods must be relatively similar in regard to their underlying socioeconomic conditions, production structures, development levels etc. If this is true, realistic assumptions about the manner according to which the ratio varies can be made. This will permit the adoption of an acceptable ratio that will facilitate the estimation of sufficiently reliable approximate value added estimates for the years direct ones cannot be made. Put differently, the question is whether one can assume that the variations of the comparative significance of the various activities can be

determined in such a way that permits us to derive valid coefficients for the examined period.

Fortunately, the answer to the above question appears to be positive¹⁸. In particular, it seems that by examining the available GDP data that refer to years 1927 and 1936¹⁹ and to the period 1948-1952²⁰ one can determine the ratios and coefficients necessary to make reliable indirect estimates.

In this context, the actual procedure that was used can be outlined as follows.

The objective is to make indirect estimates of the value-added of the activities of the tertiary sector for which this cannot be done directly for the period 1833-1939. Depending on certain general characteristics and the significance of the activities²¹, the following four sub-periods were discerned: 1914-1939 (from the outbreak of WWI to that of WWII), 1869-1913 (railways and banks in existence), 1842-1868 (pre-railways) and 1833-1841 (no banks)²².

The starting point is the GDP data given in the national accounts for 1948-1952 and those estimated by Evelpidis for 1927 and 1936²³. The value of output given for each activity was used to calculate the coefficients for these years. As can be seen in table A, the activities are classified as "known" and "unknown": known are those for which direct estimates can be made for the pre WW-II period; unknown are those for which indirect estimates are sought. By using these figures totals (A1) and (A2)²⁴, referring to the

¹⁸ If the answer is negative, the choices are extremely limited. However, even in that case some estimates can be made, though the probability is that they will be less reliable than the present ones.

¹⁹ See Evelpidis (1937 and 1938).

²⁰ See *National Statistical Services of Greece* (1972).

²¹ The periods have been chosen based on the existence (or non existence) of various basic activities.

²² Obviously the latter period 1913-1939 is considered more similar to the post-WW-II years than the earlier ones. Therefore it is examined first. The same argument can be used for each successive period as we move back in time.

²³ These are quite detailed. In addition, after certain adjustments are made to conform to present-day definitions, they also appear to be reasonably reliable. See Kostelenos (2003a).

²⁴ A1 is equal to A2. The reason for this dual naming is to avoid confusion at a later stage of the process, i.e. when the ratios are derived.

known magnitudes, and (B1) and (B2), referring to the unknown ones, are derived^{25,26}. Next, the ratios²⁷ $A1/B1$ and $A2/B2$ are calculated. This is done on the basis of data known in all cases. As can be seen in the table, three alternative measures of the ratios have been derived, corresponding to the three definitions of the totals that have been used: the first includes all activities; the second excludes railways and the third railways and banks²⁸.

Having completed the computations of the ratios and coefficients included in table A with the figures for 1927, 1936 and 1948-1952 the next step is more problematic. Here, the first step is to determine the assumed minimum and maximum values of the adjustment coefficient, defined accordingly for each period, when version (iv) of the rent markup procedure is used²⁹. For example: in the period 1914-1939 the ratio examined can be defined as $\sum 1 = (B1/A1)$ or $\sum 2 = (B2/A2)$. When scenario (iv) is used, the adjustment coefficient attains different values for years 1948-1952 (national accounts data) and 1927 and 1936 (Evelpides' data). The minimum and maximum of these figures appear in table B.-

The next step is the most delicate. The items included in the numerator and denominator are examined and, based on qualitative information, it is estimated which have increased (+), declined (-) or remained unchanged (!) in importance³⁰. Next, the overall effect of these changes is evaluated in order to determine the expected direction of change of the adjustment coefficient. In addition, the average of the given values of the adjustment coefficients is computed. Finally, by using the average,

²⁵ It must be noted that in each case four different scenarios to determine the relationship between publicly and privately paid rents have been used. Thus, in version (i) publicly paid rents are assumed to be 50% of privately-paid ones, in version (ii) 33% etc.

²⁶ The four scenarios, which refer to the rent payments, are used in order to estimate the total of rent payments on the basis of the rent payments paid by the public sector.

²⁷ As well as the corresponding adjustment (mark-up) coefficients.

²⁸ In the latter two cases only versions (ii) and (iv) of the rents breakdown are considered.

²⁹ This was considered the most reliable of the four scenarios.

³⁰ The sign [+] means that we expect that the relative significance of the examined factor (activity) is larger, the sign [-] means that the significance is smaller, the sign [!] stands for an absence of change and the sign [0] means that this activity does not exist in this particular period.

TABLE A. Estimation of markup coefficients (values in current prices)
(A) Known Magnitudes
(I) Transportation (a) Trains (+tramways) (II) Communications (III) Public (IV) Banks/Insurance (Va) Public Rents -four scenarios:(i) : 50%, (ii) : 33%, (iii): 17%, (iv): 5% (VI) Govt. expenditure for services Total (A1) (Ia) + (II) + (III) + (IV) + (Va) + (VI) -four estimates: (i), (ii), (iii), (iv) (depending on rent scenario adopted) Total (A2) (Ia) + (II) + (III) + (IV) + (Va) + (VI) -four estimates: (i), (ii), (iii), (iv) (depending on rent scenario adopted)
(B) Unknown Magnitudes
(I) Transportation (b) Water (c) Others (Vb) Private Rents -four scenarios:(i) : 50%, (ii) : 67%, (iii): 83%, (iv): 95% (VII) Trade (VIII) Sundries (IX) Construction Total (B1) (Ic) + (Vb) + (VII) + (VIII) + (IX) -four estimates: (i), (ii), (iii), (iv) (depending on rent scenario adopted) Total (B2) (Ib) + (Ic) + (Vb) + (VII) + (VIII) + (IX) -four estimates: (i), (ii), (iii), (iv) (depending on rent scenario adopted)
Ratios (A1)/(B1) -estimation of (a) percentage and (b) coefficient for each scenario (4 scenarios) Ratios (A2)/(B2) -estimation of (a) percentage and (b) coefficient for each scenario (4 scenarios) (1) Without Railways (versions (iii)-(iv)) Ratio A1/B1 -estimation of (a) percentage and (b) coefficient for each scenario (2 scenarios, i.e. (iii) and (iv)) Ratio A2/B2 -estimation of (a) percentage and (b) coefficient for each scenario (2 scenarios, i.e. (iii) and (iv)) (2) Without Railways - Banks (versions (iii)-(iv)) Ratio A1/B1 -estimation of (a) percentage and (b) coefficient for each scenario (2 scenarios, i.e. (iii) and (iv)) Ratio A2/B2 -estimation of (a) percentage and (b) coefficient for each scenario (2 scenarios, i.e. (iii) and (iv))
Notes (1) Totals A1 and A2 are the same. (2) Rents -Version (i): It is assumed that Rents paid by the Public sector equal those of the Private sector. -Version (ii): it is assumed that Rents paid by the Public sector are 1/2 of those of the Private sector (i.e. 1/3 of the total). -Version (iii): it is assumed that Rents paid by the Public sector are 1/5 of those of the Private sector (i.e. 1/6 of the total). -Version (iv): it is assumed that Rents paid by the Public sector are 5% of those of the Private sector. Totals (i), (ii), (iii) and (iv) are estimated accordingly. Version (iv) appears to be closer to the truth given Mousmoute's 1946 estimation of rents for 1920-1936. This author's estimates are based on building tax data. Evelpidis gives similar magnitudes for 1927 and 1936. (3) For 1927 the same percentages as in 1936 are adopted (see Evelpidis, who doesn't give data on construction). (4) The "without railways" version is used for the period 1842-1869 when none existed in Greece. The "without railways - banks" version is used for the pre-1842 period. For these periods insurance was ignored as its size is assumed to be negligible whereas for rent version (iii) seemed more relevant. (5) The estimation of item (VI), Public expenditure for services, proved impossible to estimate.

TABLE B. Estimation of Mark-up Coefficient (values in current prices)

Period	Adj. Coeff.	Range of Variation				Expected Changes of the Adjust. Coeff. according to the source of change			Aver. & adopted Coeff.
		Overall		Evelpides		Changes of factor importance (in relation to the basis year coeff.)	Expected Overall Variation		
		Min.	Max	Min	Max				
1914-1939 (coeff. with all factors)	Sum1 (iv)	2.11	2.93	2.11	2.27	B1 = [!] + [!] + [!] + [!] + [!] A1 = [!] + [!] + [!] + [!] + [!] B2 = [!] + [!] + [!] + [!] + [!] + [!] A2 = [!] + [!] + [!] + [!] + [!]	_1 => (=)	2.52 2.60 2.67 2.70	
	Sum 2 (iv)	2.31	3.02	2.31	2.40		_2 => (=)		
1869-1913 (coeff. with all factors)	Sum 1 (iv)	2.11	2.93	2.11	2.27	B1 = [!] + [!] + [!] + [!] + [!] A1 = [-] + [!] + [!] + [-] + [!] B2 = [!] + [!] + [!] + [!] + [!] + [!] A2 = [-] + [!] + [!] + [-] + [!]	_1 => (+)	2.52 2.70 2.67 2.90	
	Sum 2 (iv)	2.31	3.02	2.31	2.40		_2 => (+)		
1842-1868 (coeff. without railways)	Sum 1 (iv)	2.23	2.96	2.23	2.43	B1 = [!] + [!] + [!] + [!] + [!] A1 = [0] + [!] + [!] + [-] + [!] B2 = [!] + [!] + [!] + [!] + [!] + [!] A2 = [0] + [!] + [!] + [-] + [!]	_1 => (+)	2.60 2.80 2.75 3.00	
	Sum 2 (iv)	2.45	3.05	2.45	2.58		_2 => (+)		
1830-1841 (coeff. without railways banks)	Sum 1 (iv)	2.66	3.38	3.05	3.38	B1 = [!] + [-] + [!] + [-] + [-] A1 = [0] + [-] + [!] + [0] + [!] B2 = [!] + [!] + [-] + [!] + [-] + [-] A2 = [0] + [-] + [!] + [0] + [!]	_1 => (=)	3.02 3.10 3.19 3.35	
	Sum 2 (iv)	2.74	3.63	3.42	3.63		_2 => (=)		

Notes

(1) The adjustment coefficients are defined as follows:

=>Sum 1 = (B1 / A1);

-A1 = [(Trains (+Tramways)) + [Communications] + [Public sector] + [Banks (+Insurance)] + [Public rents]];

-B1 = [(Other transport.] + [Private rents] + [Trade] + [Sundries] + [Construction]];

=>Sum2 = (B2 / A2);

-A2 = [(Trains (+Tramways)) + [Communications] + [Public sector] + [Banks (+Insurance)] + [Public rents]];

-B2 = [(Water transport.] + [Other transport.] + [Private rents] + [Trade] + [Sundries] + [Construct.]]

(2) It must be noted that Evelpides does not mention construction.

(3) For the period 1842-1844 the following coefficients were adopted: 3.05 (MIN) and 3.25 (MAX). This in order to normalise the time series (it is assumed that the importance of banks is still small).

minimum and maximum figures and the expected direction of change a magnitude for the adjustment coefficient is adopted³¹.

Having estimated the values for the adjustment coefficient, what remains is to multiply them to the known component of the tertiary sector for each year to derive the total value added of the sector. In order to minimize the error, two versions of the terminal value of production are estimated. This is done by using both coefficients adopted (a minimum: $\Sigma 1$ and a maximum: $\Sigma 2$).

The estimates adopted are expressed in nominal prices and the current monetary unit for each year. In order to determine a continuous series it is necessary to take into account the change in the monetary unit effected in 1881, when the old drachma was substituted by the new (Latin Monetary Union (LMU)) drachma³². Therefore, all estimates referring to the period 1833-1880³³ have been adjusted accordingly.

4. Evaluation of the results and comparisons with other countries.

The figures derived can be considered generally reliable. Still, as they rely on certain bold assumptions one should be cautious when interpreting them and accepting the results.

Bearing this general idea in mind, an attempt will be made to use these estimates in order to answer, albeit tentatively, three questions regarding the long-term development of the Greek economy. The specific questions posed are:

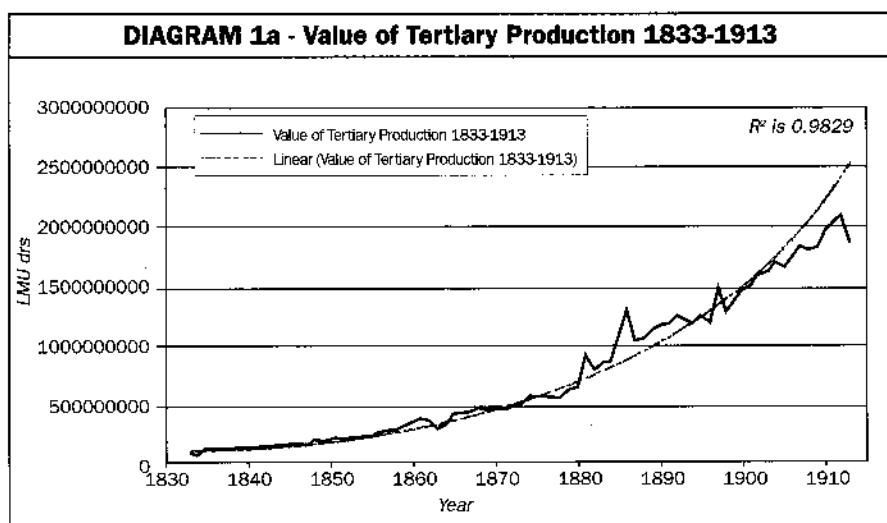
- how did the size of the tertiary sector grow in absolute values
- how did the size of the tertiary sector grow as a percentage of the GDP, and
- how did the growth of the tertiary sector, as a percentage of GDP in Greece, compare with the corresponding figures for certain other European countries.

³¹ The reliability of the employed assumptions can be criticised and questioned. In effect, these assumptions amount to conjectures according to the definition of Feinstein (1971), page 21.

³² The equivalence, determined on the basis of gold content, was: 112 old drs = 100 LMU drs.

³³ No estimates of the GDP of the years 1830-1832 have been made.

Bearing in mind that nominal prices are used³⁴, one expects the trend to be an increasing one. This is an aspect that somehow diminishes the value of the conclusions that can be derived. The increasing trend in the value of output of the tertiary sector in nominal prices for the period examined is verified in diagrams 1a-1b³⁵. Given the high inflation in the late-1910s and early-1920s it was necessary to divide the period in two sub-periods so that the results could be easily discernible³⁶. These two sub-periods are:



³⁴ The value added of each sector cannot be estimated in constant prices because the deflators that correspond to each sector are unknown. Here what was said in footnote 10 is again relevant. The construction of a deflator for services is hindered both by the lack of an available data base as well as of any relevant complementary research. The task of constructing such a deflator is the subject of a study by itself. This would involve extracting any fragments of relevant data from wherever they exist (searching the archives), constructing the relevant time series and finally using these data to construct the deflator. Clearly the time required for such a task made it imperative to forgo the (theoretically) correct procedure of using real estimates and seek out a less time-consuming approach provided that the estimates this approach yielded were within certain acceptable margins of error.

³⁵ The diagrams depict the figures contained in table (1) in the appendix.

³⁶ In these diagrams there is a one-year overlap. This makes it easier to gauge the increase between the two sub-periods. Once again, the general limitations referred to in earlier footnotes are relevant in justifying why no attempt was made to determine estimates per constant borders.

- 1833-1913, which covers the period from the independence of the modern Greek state until the Balkan wars.
- 1913-1939, which covers the period from the Balkan Wars until the outbreak of WWII

To begin, diagram (1a), refers to the first sub-period. Here one observes a large and steady increase in the value-added of the sector in the earlier years (compound annual rate of increase for 1833-1880: 4.7%)³⁷. This steady trend can be verified by the fact that actual movements appear to be very close to the general trend, although the smoothness of the movement may, partially at least, be due to the stabilizing effect of the estimation method employed. Furthermore, it should also be noted that the effects of certain reductions of public expenditure during the years 1862-1863 and of the crisis in the late-1870s, which are barely discernible in the diagram, might be underestimated. Still, the overall-increasing trend in the value of output of the sector can be considered as expected and rational. Moreover, it seems likely that this may be more a result of actual facts (i.e., the operation of the Greek state and resulting normalcy of economic life), than to inflation.

The annexation of new territories resulted in a large increase in the production of the tertiary sector in 1881. This can be clearly observed in the diagram. Thereafter, the increase carries on until the Balkan Wars, although the rate is smaller compared to that of the earlier years (compound average annual rate of increase for 1881-1912: 2.7%). Three points must be noted in regard to this sub-period. First, the mobilization of 1886-1887 and the 1897 war, which appear to have resulted in a sharp increase in the value of production of the sector. Second, the large recession of the 1890s³⁸, during which the growth of the sector remained above the trend, and third the recovery in the early-1900s, during which it remained below it. In general, fluctuations around the trend appear to have been more pronounced after 1880.

The behaviour of the sector's growth during the recession and

³⁷ The average annual increase for the period 1833-1864 is 4.6% and for the period 1864-1880 is 4.4%, including 1864 in both calculations.

³⁸ One must remember that the whole of Europe was in a mild recession during the period 1873-1896.

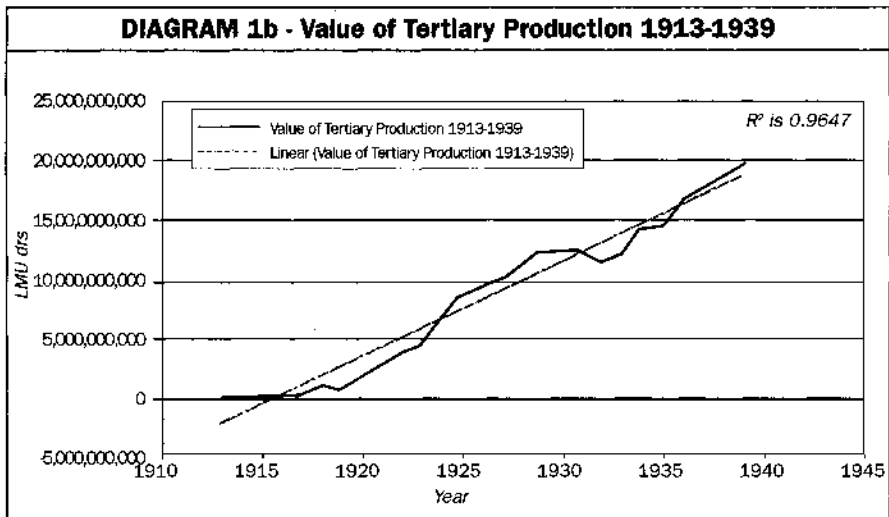
recovery periods⁹⁹ noted is obviously blurred by the peaks resulting from the 1886-87 mobilisation and the 1897 war. Tentatively, at least, one can argue on the basis of this evidence that military expenditure strongly influenced the total production of the sector. This also appears to be suggested by the increases observed after 1909. The peaks of the 1880s seem to have contributed in the formation of a sharply increasing trend, the actual increases falling below it during the recovery years of the early-1900s when there were no extraordinary increases in military spending as well as public expenditure limitations imposed by the International Financial Control authorities. Overall, the annual average rate of increase of the sector appears to have been larger in the earlier years (up to 1880) than in the later ones (1881-1913). This can be tentatively attributed to the effects of the restoration of normalcy in the earlier sub-period and the important bearing upon the averages of the figures of the latter years when there was no extraordinary military spending and a degree of control upon public expenditure in general. Here, a very bold argument would be that the increase in the output of the sector manifested in the early-1900s was due to non-government activities.

During the second sub-period (1913-1939), the increase in the value of the tertiary sector was larger, although this reflects the high inflation rates that prevailed during parts of it. The developments are shown in diagram (1b). Because of these high inflation rates one cannot derive reliable conclusions, although the average annual increase for the whole sub-period was 20%. Still, this figure cannot be discarded, considering that the price index of retail sales increased 18 times during the period 1914-1932¹⁰⁰, when the value of the output of this tertiary sector increased 51 times. Overall, the production value of the sector increased 87 times during the interwar period. The major events that should be noted here are WWI, the Asia Minor catastrophe (1922), the subsequent great inflow of refugees and the 1929 crisis. Examining

⁹⁹These can be verified by using other indicators i.e., the rise in GDP, the strength of the Greek drachma, which reached par in the mid-1910s, and the control exerted upon the growth of public expenditure.

¹⁰⁰In 1932, based on 1914 prices (1914 = 100) it was 1827. See Ministry of National Economy (1932).

diagram (1b) one notes pronounced fluctuations around the trend. These are more pronounced than in the earlier sub-period which can partially be explained by the fact that larger parts of the total value of the sector have been estimated by use of direct methods. In addition, one notes that actual values are below the trend during the war periods (WWI, Asia Minor), i.e. a marked difference when compared to the earlier sub-period. This is followed by the prevalence of some form of normalcy, when actual output values are above the trend, only for them to drop again during the years of the 1929 crisis. Finally, the output values of the sector exceed the trend in the last four years of the period. The observed behaviour cannot be explained without a more detailed study⁴¹. The tentative indications appear to suggest that the growth of the economy that commenced in the early-1900s resulted in the increased importance of non-governmental services that appear sensitive to non-normal conditions.

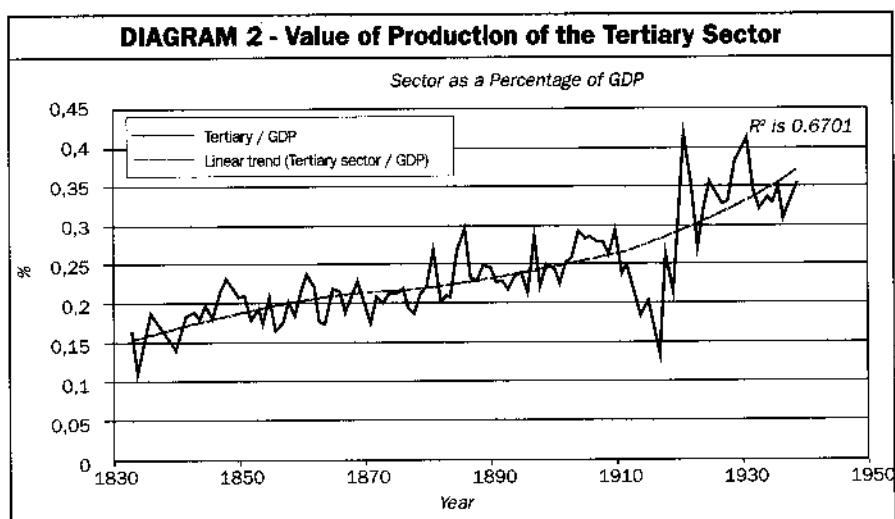


To sum up, the production of the tertiary sector follows an increasing trend, the real magnitude of which cannot be gauged because of the use of nominal values. The cyclical fluctuations can also be characterized as

⁴¹ Assuming values below the trend is just one indicator. It does not mean that the value of production of the sector or its ratio to total GDP did not increase.

expected in the sense that they can be explained by the extraordinary events that took place within the examined sub-periods, although the indications from the two sub-periods are conflicting. Thus, in the first sub-period positive divergences from the trend are detected when military mobilisations occur and negative ones when normalcy prevails. This latter feature could, however, be a result of the use of an inappropriate trend line as, despite being below it the figures do increase considerably during the first decade of the XIXth century. By comparison, in the second sub-period negative divergences appear in times of turbulence or crises and positive ones in times of normalcy. Finally, it should be noted that the variations from the trend are minimized due to the effect of the estimation method. In reality, these fluctuations should be larger than those observed.

The second question tackled is the evolution of the tertiary sector as a percentage of GDP. Diagram (2) shows that there is an increasing trend around which the fluctuations are relatively intense. Attention should be paid to the extreme values so as to explain why they exist. One such case is 1917 where one observes a large decline in the tertiary sector as a percentage of GDP. This follows the extraordinary large nominal increase in the production of the primary sector and thus of GDP and may be the outcome of anomalies in the price index. On the other hand, the military mobilisations for the operations in Minor Asia caused a large



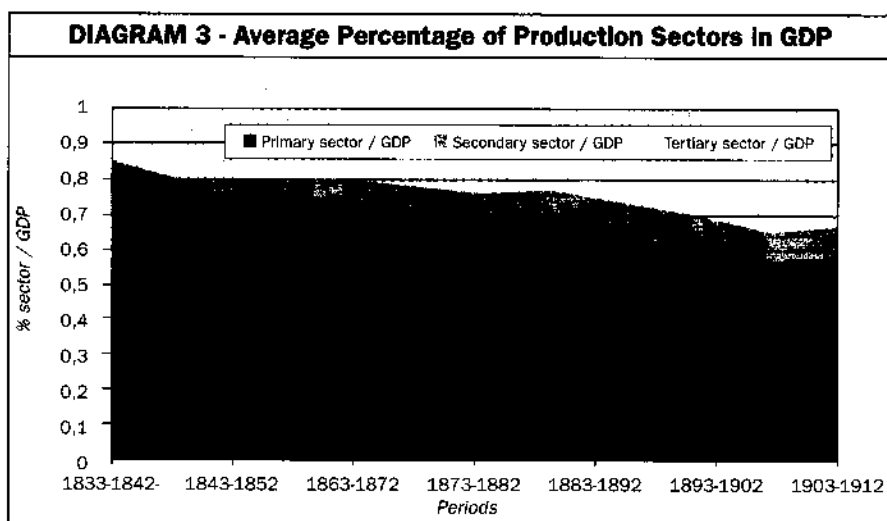
relative increase in the tertiary sector in 1921⁴². Finally, an increase in the tertiary sector as a percentage of GDP is observed in years 1930-1931. This suggests that the decline in the production of the other two sectors due to the 1929 crisis was larger.

Accordingly, the other major increases can be explained as follows:

- 1881 (annexation of Thessaly): there was a large increase in the sector's output, a smaller one in that of the primary sector and none in the secondary sector
- 1886-1887 (military mobilizations): increase in public (military) expenses leading to a large increase in the output of the tertiary sector.
- early-1900s (economic growth): increase of the ratio of the tertiary sector in GDP.

Finally, the contribution of the tertiary sector in GDP in comparison with that of the other two sectors can be seen in diagram (3), which depicts the figures appearing in table (1) in the appendix. Three points can be made here:

- The importance of the secondary sector appears to be rather small and does not change with the passage of time



⁴² This should be seen in relation to what was noted in the previous footnote. It does suggest an explanation for the anomaly noted earlier on regarding the production value of the sector and its trend.

- The importance of the tertiary sector increases through time
- The primary sector is the most important during the whole period⁴³.

The last question to be discussed is the comparison of the Greek data with those of other European countries. This is a tentative exercise, its main purpose being to gauge the overall plausibility of the estimates⁴⁴. It consists of the examination of the contribution of the tertiary sector in GDP and the countries selected are Italy, Germany and France. The comparison will be conducted by using Mitchell's⁴⁵ data, which, as must be pointed out, are not absolutely comparable internally or with ours⁴⁶. In particular, Mitchell calculates the percentage contribution of the sectors of origin in GDP. He includes the sectors of agriculture, industry, construction, transport-communication and trade. The sum of these sectors is smaller than 100%, implying that some activities of the tertiary sector are missing. In addition, in the case of France, the variable used is not GDP (Gross Domestic Product) but Net Domestic Product at 1938 prices, whereas the figure calculated for 1909 is a three-year average.

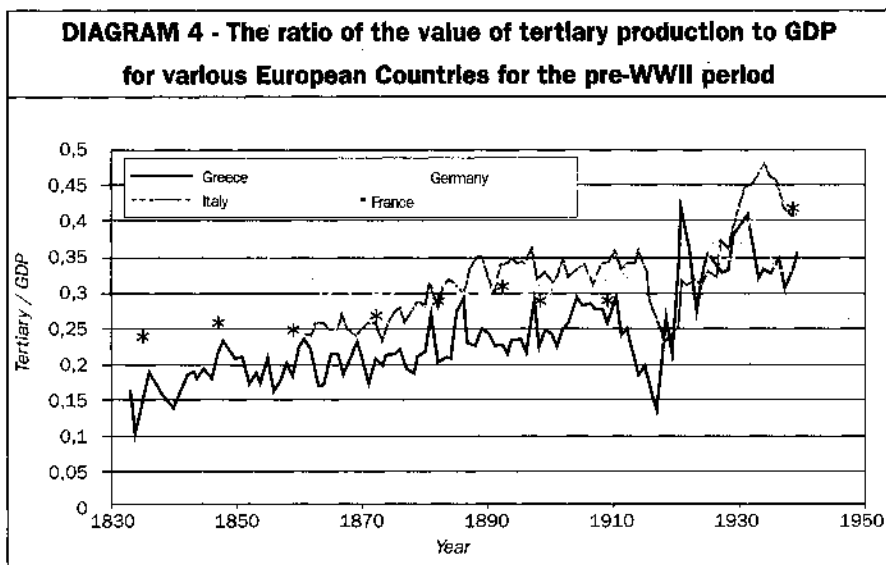
In order to be able to compare each country's data, the percentage contribution of agriculture and industry has been removed. What remained was considered to be equivalent to the percentage contribution of the tertiary sector as it is defined in the present study. The results are presented in table (2) in the appendix and depicted in diagram (4).

⁴³ The objective of the methodology used was to achieve the most accurate estimate of the total GDP. However, this methodology may have underestimated the size of the secondary in favour of the primary sector. Furthermore, the tertiary sector may also be underestimated during the later years of the period. Still, the general impression regarding the evolution of the output of each sector remains the same.

⁴⁴ Given the shortcomings inherent in the estimation procedure used it is encouraging that the estimates do not appear to be implausible when compared to those of other European countries.

⁴⁵ Mitchell (1975), p. 801-816. This source was chosen as a matter of convenience as it includes figures defined in a more-or-less consistent manner referring to the magnitudes of relevance for many countries.

⁴⁶ Mitchell also provides data for Greece. However, he only reports data for 1939, where the percentage contribution of the tertiary sector in the GDP appears to be 39%. For the reliability of other data on pre-war estimates of the GDP in Greece see Kostelenos (2003a).



The first point that results from examining the diagram is that the size of the tertiary sector in Greece lagged in comparison to the corresponding sizes in the other three countries until 1920. This is to be expected. Then, in the next ten years it seems that it was approximately the same in all three countries (excluding France). Finally, after 1930, the size of the sector was smaller in Greece than in Italy and France, but bigger than in Germany. At that time, the significance of industry (i.e. the secondary sector) in Germany was quite high, thus reducing the percentage of the primary and tertiary sectors in the country's GDP. At the same time, the situation in Greece was reversed; the primary sector accounted for the highest percentage of GDP, while the secondary sector was underdeveloped.

A second point is that, until 1913, the percentage of the tertiary sector in Germany does not change. In contrast, the percentage of the sector in Italy moves similarly to that in Greece. Thus, an overall increasing trend and abrupt fluctuations during the WWI period are observed in that country. As for France, little can be said about the annual movement of the relevant percentage, as there are too few observations. However, its size seems to be more stable than that of Italy, but not as stable as that of Germany.

To sum up, the changes in the tertiary sector as a percentage of GDP in Greece compared with those of the other three European countries give the impression that they are rational. Obviously, there is need of a more extensive study regarding the subject, especially of the similarities in the movement of the tertiary sector in Greece and Italy¹⁷.

5. Conclusions

In general, the conclusions that can be drawn by examining the evolution of tertiary production in Greece during the period 1833-1939 can be considered plausible. In particular, there seem to be no unexpected developments that cannot be explained. On the other hand, both the trends and the fluctuations suggest that the estimates do not deviate substantially from reality. This indication is further reinforced when the growth of the tertiary sector as a percentage of GDP in Greece in comparison with the corresponding figures in some other European countries is examined. Once again the conclusions appear to be reasonable.

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¹⁷ See Kostelenos (2003b).

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APPENDIX

TABLE 1. Total Value of Production (av. MIN+MAX) (values in 000 LMU drs)					
Year	Tot. Prim. Prod.	Second. prod.	Tertiary prod.	GDP: Grand Total	Tert/ GDP
	drs	drs	drs	drs	(ratio)
	1	2	3	4	5
1830					
1831					
1832					
1833	41,246	0	8,082	49,328	0.16
1834	53,761	0	6,350	60,111	0.11
1835	64,493	0	11,546	76,038	0.15
1836	52,695	0	12,179	64,874	0.19
1837	58,683	0	12,448	71,131	0.17
1838	62,857	1,253	12,452	76,561	0.16
1839	68,249	1,432	12,478	82,159	0.15
1840	76,587	1,432	12,492	90,511	0.14
1841	66,959	1,779	12,787	81,524	0.16
1842	57,023	1,786	13,242	72,051	0.18
1843	55,118	1,884	13,303	70,305	0.19
1844	57,222	1,945	13,120	72,287	0.18
1845	56,131	2,008	14,417	72,555	0.20
1846	60,678	2,606	14,027	77,311	0.18
1847	52,523	2,677	15,002	70,202	0.21
1848	57,827	2,696	18,218	78,740	0.23
1849	60,280	2,828	17,965	81,072	0.22
1850	68,002	2,971	18,753	89,726	0.21
1851	70,387	3,352	19,753	93,492	0.21
1852	86,435	4,752	19,885	111,072	0.18
1853	77,667	5,517	19,732	102,916	0.19
1854	92,942	5,305	20,624	118,870	0.17
1855	81,190	5,810	22,909	109,909	0.21
1856	120,030	6,705	24,864	151,599	0.16
1857	114,082	6,102	25,616	145,800	0.18
1858	101,699	6,807	27,889	136,395	0.20
1859	127,959	7,469	30,748	166,176	0.19
1860	110,810	7,833	33,563	152,206	0.22
1861	106,252	8,417	35,612	150,281	0.24
1862	109,643	10,282	34,566	154,490	0.22
1863	120,008	11,873	28,253	160,134	0.18
1864	143,128	11,614	32,527	187,269	0.17
1865	130,437	11,914	39,935	182,285	0.22
1866	139,532	12,835	41,891	194,258	0.22
1867	171,950	12,681	42,468	227,098	0.19
1868	158,705	13,457	45,454	217,616	0.21
1869	133,820	14,591	44,608	193,019	0.23
1870	167,805	16,428	46,253	230,486	0.20
1871	200,757	17,052	45,646	263,454	0.17
1872	158,017	17,148	46,295	221,460	0.21
1873	173,313	18,204	48,044	239,560	0.20
1874	183,091	18,740	54,659	256,489	0.21
1875	180,345	21,028	54,635	256,007	0.21
1876	172,084	20,455	54,314	246,853	0.22
1877	206,518	18,977	54,701	280,196	0.20
1878	212,821	20,904	54,170	287,894	0.19
1879	203,729	19,566	61,178	284,472	0.22
1880	210,016	19,631	64,369	294,015	0.22
1881	229,740	19,605	91,192	340,537	0.27
1882	276,661	24,401	77,431	378,493	0.20
1883	293,398	24,082	84,557	402,037	0.21
1884	299,697	24,291	85,610	409,598	0.21

continues

TABLE 1. Total Value of Production (av. MIN+MAX) (values in 000 LMU drs)

continues

Year	Tot. Prlm. Prod.	Second. prod.	Tertiary prod.	GDP: Grand Total	Tert/ GDP
	drs	drs	drs	drs	(ratio)
	1	2	3	4	5
1885	270,646	24,075	109,650	404,370	0.27
1886	274,553	25,026	128,306	427,885	0.30
1887	317,690	24,737	103,126	445,553	0.23
1888	325,902	27,326	104,616	457,844	0.23
1889	303,465	26,625	110,922	441,012	0.25
1890	319,211	30,000	114,500	463,711	0.25
1891	359,748	30,963	115,364	506,075	0.23
1892	375,680	32,116	122,388	530,183	0.23
1893	398,734	32,160	119,451	550,345	0.22
1894	348,368	33,261	116,168	497,796	0.23
1895	358,630	37,402	123,140	519,172	0.24
1896	396,748	37,087	117,655	551,490	0.21
1897	324,508	40,639	147,101	512,248	0.29
1898	399,316	43,370	125,923	568,609	0.22
1899	355,170	51,678	135,970	542,817	0.25
1900	390,181	51,012	144,126	585,319	0.25
1901	453,656	60,442	149,782	663,880	0.23
1902	413,002	66,085	158,960	638,047	0.25
1903	390,258	72,575	161,153	623,985	0.26
1904	324,138	79,945	168,370	572,453	0.29
1905	341,398	73,575	164,619	579,592	0.28
1906	348,187	82,835	173,495	604,517	0.29
1907	377,420	88,265	181,038	646,723	0.28
1908	365,893	93,496	179,008	638,397	0.28
1909	409,048	99,996	180,421	689,465	0.26
1910	360,020	105,950	194,900	660,869	0.29
1911	530,826	114,826	201,884	847,537	0.24
1912	486,868	129,610	207,385	823,863	0.25
1913	534,160	138,220	184,342	856,722	0.22
1914	886,703	124,401	224,683	1,235,787	0.18
1915	998,907	133,502	288,467	1,420,877	0.20
1916	1,413,550	157,471	311,908	1,882,929	0.17
1917	2,116,409	210,412	362,205	2,689,025	0.13
1918	2,712,755	369,846	1,113,551	4,196,152	0.27
1919	2,620,801	361,672	807,278	3,789,750	0.21
1920	3,316,298	420,487	1,624,752	5,361,537	0.30
1921	3,500,257	465,548	2,855,943	6,821,748	0.42
1922	6,105,364	754,311	3,920,459	10,780,135	0.36
1923	10,932,020	1,140,782	4,485,796	16,558,597	0.27
1924	12,584,092	1,432,017	6,702,236	20,718,344	0.32
1925	13,532,864	1,871,182	8,588,239	23,992,285	0.36
1926	16,505,185	2,039,284	9,672,543	28,217,012	0.34
1927	18,359,888	2,407,377	10,107,520	30,874,785	0.33
1928	19,810,386	2,658,212	11,150,401	33,618,998	0.33
1929	17,198,472	2,832,830	12,356,526	32,387,828	0.38
1930	15,997,451	2,799,671	12,292,811	31,089,933	0.40
1931	14,920,653	2,572,383	12,258,909	29,751,945	0.41
1932	18,750,424	2,824,743	11,496,734	33,071,900	0.35
1933	22,749,855	3,286,222	12,313,899	38,349,976	0.32
1934	24,171,349	3,776,597	14,137,679	42,085,625	0.34
1935	25,803,917	4,035,098	14,655,173	44,494,188	0.33
1936	26,054,864	4,318,939	16,351,581	46,725,384	0.35
1937	34,205,026	4,967,317	17,398,467	56,570,810	0.31
1938	32,062,563	5,140,973	18,485,243	55,688,779	0.33
1939	30,771,065	4,507,916	19,557,355	54,836,336	0.36

TABLE 2. The Tertiary Sector as a ratio of GDP				
Year	Greece	Italy	Germany	France
	1	2	3	4
1830				
1831				
1832				
1833	0.16			
1834	0.11			
1835	0.15			0.24
1836	0.19			
1837	0.17			
1838	0.16			
1839	0.15			
1840	0.14			
1841	0.16			
1842	0.18			
1843	0.19			
1844	0.18			
1845	0.20			
1846	0.18			
1847	0.21			0.26
1848	0.23			
1849	0.22			
1850	0.21		0.32	
1851	0.21		0.34	
1852	0.18		0.33	
1853	0.19		0.35	
1854	0.17		0.34	
1855	0.21		0.35	
1856	0.16		0.33	
1857	0.18		0.32	
1858	0.20		0.33	
1859	0.19		0.32	0.25
1860	0.22		0.32	
1861	0.24	0.24	0.33	
1862	0.22	0.24	0.32	
1863	0.18	0.26	0.31	
1864	0.17	0.26	0.29	
1865	0.22	0.25	0.30	
1866	0.22	0.25	0.31	
1867	0.19	0.27	0.31	
1868	0.21	0.25	0.30	
1869	0.23	0.24	0.31	
1870	0.20	0.25	0.32	
1871	0.17	0.26	0.31	
1872	0.21	0.26	0.30	0.27
1873	0.20	0.23	0.30	
1874	0.21	0.25	0.29	
1875	0.21	0.27	0.30	
1876	0.22	0.28	0.31	
1877	0.20	0.26	0.31	
1878	0.19	0.28	0.30	
1879	0.22	0.29	0.31	
1880	0.22	0.28	0.32	
1881	0.27	0.31	0.31	
1882	0.20	0.28	0.32	0.29
1883	0.21	0.31	0.31	
1884	0.21	0.32	0.31	

continues

TABLE 2. The Tertiary Sector as a ratio of GDP

<i>continues</i>				
Year	Greece	Italy	Germany	France
	1	2	3	4
1885	0.27	0.31	0.30	
1886	0.30	0.30	0.30	
1887	0.23	0.33	0.30	
1888	0.23	0.35	0.31	
1889	0.25	0.35	0.30	
1890	0.25	0.32	0.30	
1891	0.23	0.30	0.32	
1892	0.23	0.34	0.31	0.31
1893	0.22	0.34	0.31	
1894	0.23	0.35	0.31	
1895	0.24	0.34	0.31	
1896	0.21	0.34	0.30	
1897	0.29	0.36	0.32	
1898	0.22	0.32	0.31	0.29
1899	0.25	0.33	0.31	
1900	0.25	0.32	0.30	
1901	0.23	0.31	0.32	
1902	0.25	0.35	0.32	
1903	0.26	0.32	0.31	
1904	0.29	0.33	0.31	
1905	0.28	0.34	0.31	
1906	0.29	0.33	0.33	
1907	0.28	0.31	0.32	
1908	0.28	0.34	0.32	
1909	0.26	0.34	0.32	0.29
1910	0.29	0.36	0.32	
1911	0.24	0.33	0.33	
1912	0.25	0.34	0.32	
1913	0.22	0.34	0.32	
1914	0.18	0.36		
1915	0.20	0.33		
1916	0.17	0.28		
1917	0.13	0.26		
1918	0.27	0.23		
1919	0.21	0.24		
1920	0.30	0.25		
1921	0.42	0.32		
1922	0.36	0.31		
1923	0.27	0.32		
1924	0.32	0.31		
1925	0.36	0.33	0.35	
1926	0.34	0.32	0.38	
1927	0.33	0.37	0.35	
1928	0.33	0.36	0.35	
1929	0.38	0.38	0.35	
1930	0.40	0.43	0.37	
1931	0.41	0.45	0.39	
1932	0.35	0.45	0.41	
1933	0.32	0.47	0.38	
1934	0.34	0.48	0.37	
1935	0.33	0.46	0.35	
1936	0.35	0.46	0.33	
1937	0.31	0.42	0.33	
1938	0.33	0.41	0.33	0.42
1939	0.36	0.41		

